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(54) **Fabric softening compositions**

(57) The present invention relates to a storage stable liquid fabric softening composition comprising one or more fabric softener materials and a mixture of at least two cationic dye fixing agents, said composition providing an effective reduction of the amount of dyes released from coloured fabrics upon wet domestic treatments.

**EP 0 811 680 A1**

**Description**Field of the invention

The present invention relates to stabilised liquid fabric softening compositions which reduce the amount of dyes released from coloured fabrics upon wet treatment such as those which occur in a laundry operation.

Background of the invention

The domestic treatment of colored fabrics is a problem known in the art to the formulator of laundry compositions. More particularly, the problem of formulating laundry compositions which reduce the amount of dyes released from coloured fabrics upon wet treatment is a particular challenge to the formulator. This problem is now even more acute with the trends of consumer to move towards more colored fabrics.

Numerous solutions have been proposed in the art to solve this problem such as by treating the fabric with a dye scavenger during the washing process as described in EP 0,341,205, EP 0,033,815 and with a polyvinyl substance as described in WO 94/11482 or in the rinse cycle as described in EP 0,462,806.

However, notwithstanding the advances in the art, there is still a need for a composition which effectively reduces the amount of dyes released from coloured fabrics upon wet treatment.

Furthermore, a problem encountered with these prior art solutions is that the dye fixing agents when used in the washing process may be destroyed or damaged by contact on storage and/or during the process, whilst when used in the rinse cycle the use of a dye fixing agent in combination with a fabric softener will provide in-product phase instability. Hence, the Applicant observed that the use of a dye fixing agent at total levels as low as 0.5% by weight in a fabric softener composition produced a detrimental effect on the storage stability of the resulting compositions. Such instability was more particularly seen at a total level of dye fixing agent of at least 3% by weight. As a result of this in-product phase instability problem, the composition aesthetic, e.g the homogeneity of the compositions, has been seen reduced.

The Applicant has now found that the use of a mixture of at least two cationic dye fixing agents in a liquid fabric softening composition comprising one or more fabric softener material fulfills such a need.

Advantageously, the Applicant has found that contrary to the use of one dye fixing agent, the use of such a mixture, when incorporated in a fabric softening composition, also allows an ease in the formulation of the product as well as producing a product with good storage stability. These benefits are more preferably seen where the said cationic dye fixing agents have different solubility, e.g the mixture comprises at least one water-soluble cationic dye fixing agent and at least one water-insoluble cationic dye fixing agent.

It is therefore an advantage of the invention to provide a fabric softening composition which provides effective reduction of the amount of dyes released from coloured fabrics upon wet domestic treatments.

It is another advantage of the invention to provide fabric softening compositions with effective storage stability properties.

It is another advantage of the invention to provide fabric softening compositions with effective softening properties.

Summary of the invention

The present invention relates to a liquid fabric softening composition comprising one or more fabric softener material and a mixture of at least two cationic dye fixing agents. In a preferred embodiment of the invention, the cationic dye fixing agents have different solubilities, i.e. the mixture comprises at least one water-soluble cationic dye fixing agent and at least one water-insoluble cationic dye fixing agent.

In accordance with another aspect of the present invention, a method for treating fabrics is provided. The method comprises contacting the fabrics during the rinse cycle of a consumer laundry process with an aqueous medium containing at least 50 ppm of a liquid fabric softening composition of the invention.

Detailed description of the inventionCationic dye fixing agent

One essential feature of the invention is a mixture of at least two cationic dye fixing agents. Preferably for enhanced storage stability and ease of formulation of the composition, the dye fixing agents are structurally different, more preferably structurally different so as to have different solubility and more preferably so that at least one of the dye fixing agent is water-soluble and at least one is water-insoluble. By "water-soluble cationic dye fixing agents is meant that a composition containing 10% by weight of cationic dye fixing agent in water is transparent at room temperature (15°C to 25°C). By "transparent" is meant a substance which permits the passage of rays of the visible spectrum. Similarly, by "water-insoluble cationic dye fixing agent" is meant that a composition containing 10% by weight of cationic dye fixing

agent in water is not transparent, e.g. cloudy or opaque, at room temperature (15°C to 25°C).

Cationic dye fixing agents, or "fixatives", are well-known, commercially available materials which are designed to improve the appearance of dyed fabric by minimizing the loss of dye from fabrics due to washing. By cationic is meant components based on various quaternized or otherwise cationically charged organic nitrogen compounds.

5 Suitable cationic dye fixing agents for use herein are described in "Aftertreatments for improving the fastness of dyes on textile fibres" by Christopher C. Cook (REV. PROG. COLORATION Vol. 12, 1982). Preferred dye fixing agents suitable for use in the present invention are ammonium compounds such as fatty acid - diamine condensates e.g. the hydrochloride, acetate, methosulphate and benzyl hydrochloride of oleyldiethyl aminoethylamide, oleylmethyl-diethyl-enediamine methosulphate, monostearylethylene diaminotrimethylammonium metho sulphate and oxidized products of  
10 tertiary amines; derivatives of polymeric alkyldiamines, polyamine-cyanuric chloride condensates and aminated glycerol dichlorohydrins.

In a preferred embodiment of the invention, it is preferred for better storage stability that the mixture of dye fixing agents comprises water-soluble and water-insoluble dye fixing agents. However, not to be bound by theory, it is believed that for the above mentioned compounds the water-solubility is influenced by several factors, e.g molecular weight,  
15 number of cationic charges and/or the counteranion. Accordingly, determination of the water-solubility or insolubility property of each component, considered for use in the mixture, will easily be made by the skilled person according to the above mentioned conditions.

Other water-soluble cationic dye fixatives and water-insoluble cationic dye fixatives are available under various trade names from several suppliers. Representative examples of water-soluble cationic dye fixatives include: CRO-  
20 SCOLOR PMF (July 1981, Code No. 7894) and CROSCOLOR NOFF (January 1988, Code No. 8544) from Crosfield; SANDOFIX TPS, which is also available from Sandoz and is a preferred polycationic fixative for use herein, SANDOFIX SWE (cationic resinous compound), Tinofix® ECO available from Ciba-Geigy and REWIN DWR from CHT-Beitlich GMBH.

Representative examples of water-insoluble cationic dye fixatives include: INDOSOL E-50 (February 27, 1984, Ref.  
25 No. 6008.35.84; polyethyleneamine-based) from Sandoz; REWIN SRF and REWIN SRF-O from CHT-Beitlich GMBH.

The total amount of cationic dye fixing agents to be employed in the composition of the invention will typically be of at least 0.1 % by weight of the composition. Advantageously, the compositions according to the invention can contain a high level of cationic dye fixing agents, as high as 10% by weight without being detrimental to the stability of the compositions. However, for economical reasons, it is preferred to have a lower level of cationic dye fixing agents of 0.5% to  
30 8% by weight, more preferably from 1% to 5% by weight and most preferably from 3% to 5% by weight of the composition. An advantage of these lower levels is that the formulation cost is reduced without being detrimental to the stability of the composition or the dye fixing performance of the composition.

For optimum dye fixing benefit, it is preferred that the mixture of cationic dye fixing agents is a mixture of a water-soluble dye fixing agent and a water-insoluble dye fixing agent in a weight ratio of soluble dye fixing agent to insoluble  
35 dye fixing agent of 0.01:1 to 2:1, preferably 0.1:1 to 1:1, more preferably 0.3:1 to 0.8:1.

#### Fabric softeners

Another essential component of the invention is a fabric softener. The fabric softening materials for use herein may  
40 be selected from the group consisting of cationic, nonionic, amphoteric or anionic fabric softening material, preferably cationic fabric softener materials.

Typical levels of said fabric softener components within the liquid softener compositions are from 1% to 80% by weight of the compositions. Depending on the composition execution which can be dilute with a preferred level of fabric softening components from 1% to 5%, or concentrated, with a preferred level of fabric softening components from 5%  
45 to 80%, more preferably 10% to 50%, most preferably 15% to 35% by weight.

Typical cationic fabric softening components having at least two long chains include the water-insoluble quaternary-ammonium fabric softening actives, the most commonly used having been di-long alkyl chains ammonium chloride.

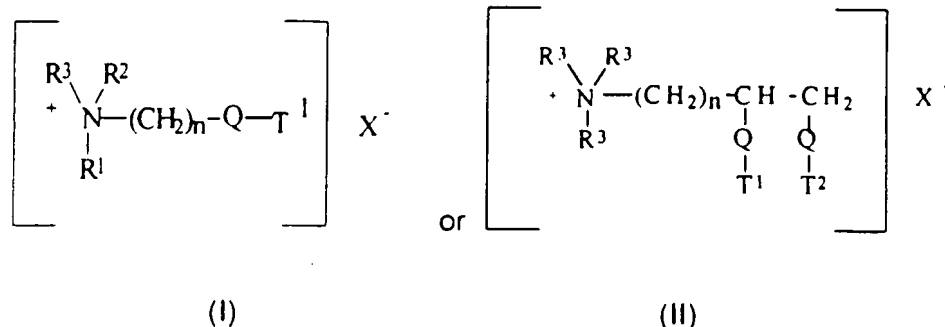
Preferred cationic softeners among these include the following:

- 50 1) ditallow dimethylammonium chloride (DTDMAC);
- 2) dihydrogenated tallow dimethylammonium chloride;
- 3) dihydrogenated tallow dimethylammonium methylsulfate;
- 4) distearyl dimethylammonium chloride;
- 55 5) dioleyl dimethylammonium chloride;
- 6) dipalmityl hydroxyethyl methylammonium chloride;
- 7) stearyl benzyl dimethylammonium chloride;
- 8) tallow trimethylammonium chloride;
- 9) hydrogenated tallow trimethylammonium chloride;

- 10) C<sub>12-14</sub> alkyl hydroxyethyl dimethylammonium chloride;
- 11) C<sub>12-18</sub> alkyl dihydroxyethyl methylammonium chloride;
- 12) ditallow imidazolinium methylsulfate;
- 13) 1-(2-tallowylamidoethyl)-2-tallowyl imidazolinium methylsulfate.

However, in recent years, the need has arisen for more environmental-friendly materials, and rapidly biodegradable quaternary ammonium compounds have been presented as alternatives to the traditionally used di-long chain ammonium chlorides. Such quaternary ammonium compounds contain long chain alk(en)yl groups interrupted by functional groups such as carboxy groups. Said materials and fabric softening compositions containing them are disclosed in numerous publications such as EPA 040 562, and EPA 239 910.

The quaternary ammonium compounds and amine precursors herein have the formula (I) or (II), below:



Q is selected from the group consisting of -O-C(O)-, -C(O)-O-, -O-C(O)-O-, -NR<sup>4</sup>-C(O)-, -C(O)-NR<sup>4</sup>-;

$R^1$  is  $(CH_2)_n-Q-T^2$  or  $T^3$ .

$R^2$  is  $(CH_2)_m-Q-T^4$  or  $T^5$  or  $R^3$ ;

R<sup>3</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> hydroxyalkyl or H;

R<sup>4</sup> is H or C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> hydroxyalkyl;

T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, T<sup>4</sup>, T<sup>5</sup> are independently C<sub>11</sub>-C<sub>22</sub> alkyl or alkenyl;

$n$  and  $m$  are integers from 1 to 4; and

X<sup>-</sup> is a softener-compatible anion.

Non-limiting examples of softener-compatible anions include chloride or methyl sulfate.

The alkyl, or alkenyl, chain T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, T<sup>4</sup>, T<sup>5</sup> must contain at least 11 carbon atoms, preferably at least 16 carbon atoms. The chain may be straight or branched.

Tallow is a convenient and inexpensive source of long chain alkyl and alkenyl material. The compounds wherein T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, T<sup>4</sup>, T<sup>5</sup> represents the mixture of long chain materials typical for tallow are particularly preferred.

Specific examples of quaternary ammonium compounds suitable for use in the aqueous fabric softening compositions herein include:

- 1) N,N-di(tallowyl-oxy-ethyl)-N,N-dimethyl ammonium chloride;
- 2) N,N-di(tallowyl-oxy-ethyl)-N-methyl, N-(2-hydroxyethyl) ammonium chloride;
- 3) N,N-di(2-tallowyl-oxy-2-oxo-ethyl)-N,N-dimethyl ammonium chloride;
- 4) N,N-di(2-tallowyl-oxy-ethylcarbonyloxyethyl)-N,N-dimethyl ammonium chloride;
- 5) N-(2-tallowyl-oxy-2-ethyl)-N-(2-tallowyloxy-2-oxo-ethyl)-N,N-dimethyl ammonium chloride;
- 6) N,N,N-tri(tallowyl-oxy-ethyl)-N-methyl ammonium chloride;
- 7) N-(2-tallowyl-oxy-2-oxoethyl)-N-(tallowyl-N,N-dimethyl-ammonium chloride);
- 8) N-methyl-N-(3-tallowamidopropyl),N-(2-tallowyloxyethyl) ammonium chloride;
- 9) 1,2-ditallowyl-oxy-3-trimethylammoniopropane chloride;

and mixtures of any of the above materials.

Of these, compounds 1-8 are examples of compounds of Formula (I); compound 9 is a compound of Formula (II).

Particularly preferred is N,N-di(tallowyl-oxy-ethyl)-N,N-dimethyl ammonium chloride, where the tallow chains are at least partially unsaturated.

The level of unsaturation of the tallow chain can be measured by the Iodine Value (IV) of the corresponding fatty

acid, which in the present case should preferably be in the range of from 5 to 100 with two categories of compounds being distinguished, having a IV below or above 25.

Indeed, for compounds of Formula (I) made from tallow fatty acids having an IV of from 5 to 25, preferably 15 to 20, it has been found that a cis/trans isomer weight ratio greater than 30/70, preferably greater than 50/50 and more preferably greater than 70/30 provides optimal concentrability.

For compounds of Formula (I) made from tallow fatty acids having an IV of above 25, the ratio of cis to trans isomers has been found to be less critical unless very high concentrations are needed.

Other examples of suitable quaternary ammoniums of Formula (I) and (II) are obtained by, e.g.:

- replacing "tallow" in the above compounds with, for example, coco, palm, lauryl, oleyl, ricinoleyl, stearyl, palmityl, or the like, said fatty acyl chains being either fully saturated, or preferably at least partly unsaturated;
- replacing "methyl" in the above compounds with ethyl, ethoxy, propyl, propoxy, isopropyl, butyl, isobutyl or t-butyl;
- replacing "chloride" in the above compounds with bromide, methylsulfate, formate, sulfate, nitrate, and the like.

In fact, the anion is merely present as a counterion of the positively charged quaternary ammonium compounds. The nature of the counterion is not critical at all to the practice of the present invention. The scope of this invention is not considered limited to any particular anion.

By "amine precursors thereof" is meant the secondary or tertiary amines corresponding to the above quaternary ammonium compounds, said amines being substantially protonated in the present compositions due to the claimed pH values.

For the preceding biodegradable fabric softening agents, the pH of the compositions herein is an essential parameter of the present invention. Indeed, it influences the stability of the quaternary ammonium or amine precursors compounds, especially in prolonged storage conditions.

The pH, as defined in the present context, is measured in the neat compositions at 20°C. For optimum hydrolytic stability of these compositions, the neat pH, measured in the above-mentioned conditions, must be in the range of from 2.0 to 4.5. Preferably, where the liquid fabric softening compositions of the invention are in a diluted form, the pH of the neat composition is in the range of 2.0 to 3.0. The pH of these compositions herein can be regulated by the addition of a Bronsted acid.

Examples of suitable acids include the inorganic mineral acids, carboxylic acids, in particular the low molecular weight (C<sub>1</sub>-C<sub>5</sub>) carboxylic acids, and alkylsulfonic acids. Suitable inorganic acids include HCl, H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub> and H<sub>3</sub>PO<sub>4</sub>. Suitable organic acids include formic, acetic, citric, methylsulfonic and ethylsulfonic acid. Preferred acids are citric, hydrochloric, phosphoric, formic, methylsulfonic acid, and benzoic acids.

Other fabric softening materials may be used in addition or alternatively to the biodegradable fabric softener. These may be selected from the group consisting of cationic fabric softening materials such as di-long alkyl chain ammonium chloride, nonionic, amphoteric or anionic fabric softening materials. Disclosure of such materials may be found in US 4,327,133; 4,421,792; 4,426,299; 4,460,485; 3,644,203 and 4,661,269.

Typically, such nonionic fabric softener materials have an HLB of from about 2 to about 9, more typically from about 3 to about 7. Such nonionic fabric softener materials tend to be readily dispersed either by themselves, or when combined with other materials such as single-long-chain alkyl cationic surfactant described in detail hereinafter. Dispersibility can be improved by using more single-long-chain alkyl cationic surfactant, mixture with other materials as set forth hereinafter, use of hotter water, and/or more agitation. In general, the materials selected should be relatively crystalline, higher melting, (e.g. >40°C) and relatively water-insoluble.

Preferred nonionic softeners are fatty acid partial esters of polyhydric alcohols, or anhydrides thereof, wherein the alcohol, or anhydride, contains from 2 to 18, preferably from 2 to 8, carbon atoms, and each fatty acid moiety contains from 12 to 30, preferably from 16 to 20, carbon atoms. Typically, such softeners contain from one to 3, preferably 2 fatty acid groups per molecule.

The polyhydric alcohol portion of the ester can be ethylene glycol, glycerol, poly (e.g., di-, tri-, tetra-, penta-, and/or hexa-) glycerol, xylitol, sucrose, erythritol, pentaerythritol, sorbitol or sorbitan. Sorbitan esters and polyglycerol monostearate are particularly preferred.

The fatty acid portion of the ester is normally derived from fatty acids having from 12 to 30, preferably from 16 to 20, carbon atoms, typical examples of said fatty acids being lauric acid, myristic acid, palmitic acid, stearic acid and behenic acid.

Highly preferred optional nonionic softening agents for use in the present invention are the sorbitan esters, which are esterified dehydration products of sorbitol, and the glycerol esters.

Commercial sorbitan monostearate is a suitable material. Mixtures of sorbitan stearate and sorbitan palmitate having stearate/palmitate weight ratios varying between about 10:1 and about 1:10, and 1,5-sorbitan esters are also useful. Glycerol and polyglycerol esters, especially glycerol, diglycerol, triglycerol, and polyglycerol mono- and/or di-esters, preferably mono-, are preferred herein (e.g. polyglycerol monostearate with a trade name of Radiasurf 7248).

Useful glycerol and polyglycerol esters include mono-esters with stearic, oleic, palmitic, lauric, isostearic, myristic,

and/or behenic acids and the diesters of stearic, oleic, palmitic, lauric, isostearic, behenic, and/or myristic acids. It is understood that the typical mono-ester contains some di- and tri-ester, etc.

The "glycerol esters" also include the polyglycerol, e.g., diglycerol through octaglycerol esters. The polyglycerol polyols are formed by condensing glycerin or epichlorohydrin together to link the glycerol moieties via ether linkages. The mono- and/or diesters of the polyglycerol polyols are preferred, the fatty acyl groups typically being those described hereinbefore for the sorbitan and glycerol esters.

Among the above disclosed fabric softener materials, the preferred fabric softeners for the purpose of the invention are the cationic biodegradable fabric softeners.

#### Liquid carrier

The compositions of the invention also contain a liquid carrier. Suitable liquid carriers are selected from water, organic solvents and mixtures thereof. The liquid carrier employed in the instant compositions is preferably at least primarily water due to its low cost relative availability, safety, and environmental compatibility. The level of water in the liquid carrier is preferably of at least 50%, most preferably at least 60%, by weight of the carrier. Mixtures of water and low molecular weight, e.g., <200, organic solvent, e.g., lower alcohol such as ethanol, propanol, isopropanol or butanol are useful as the carrier liquid. Low molecular weight alcohols include monohydric, dihydric (glycol, etc.) trihydric (glycerol, etc.), and higher polyhydric (polyols) alcohols.

#### Optional components

Surfactant concentration aids may also optionally be used. Surfactant concentration aids are typically selected from the group consisting of single long chain alkyl cationic surfactants, nonionic surfactants, amine oxides, fatty acids, and mixtures thereof, typically used at a level of from 0 to 15% of the composition.

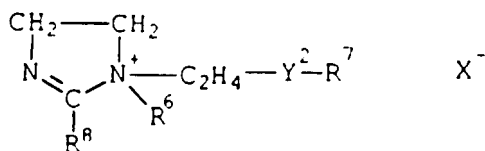
#### Single long chain alkyl cationic surfactants

Such mono-long-chain-alkyl cationic surfactants useful in the present invention are, preferably, quaternary ammonium salts of the general formula:



wherein the  $R^2$  group is  $C_{10}$ - $C_{22}$  hydrocarbon group, preferably  $C_{12}$ - $C_{18}$  alkyl group of the corresponding ester linkage interrupted group with a short alkylene ( $C_1$ - $C_4$ ) group between the ester linkage and the N, and having a similar hydrocarbon group, e.g., a fatty acid ester of choline, preferably  $C_{12}$ - $C_{14}$  (coco) choline ester and/or  $C_{16}$ - $C_{18}$  tallow choline ester at from 0.1% to 20% by weight of the softener active. Each R is a  $C_1$ - $C_4$  alkyl or substituted (e.g., hydroxy) alkyl, or hydrogen, preferably methyl, and the counterion  $X^-$  is a softener compatible anion, for example, chloride, bromide, methyl sulfate, etc. Other cationic materials with ring structures such as alkyl imidazoline, imidazolinium, pyridine, and pyridinium salts having a single  $C_{12}$ - $C_{30}$  alkyl chain can also be used. Very low pH is required to stabilize, e.g., imidazoline ring structures.

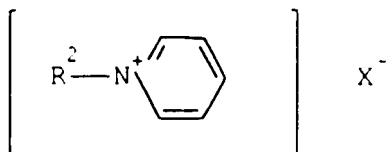
Some alkyl imidazolinium salts and their imidazoline precursors useful in the present invention have the general formula:



wherein  $Y^2$  is  $-C(O)-O-$ ,  $-O-(O)C-$ ,  $-C(O)-N(R^5)-$ , or  $-N(R^5)-C(O)-$  in which  $R^5$  is hydrogen or a  $C_1$ - $C_4$  alkyl radical;  $R^6$  is a  $C_1$ - $C_4$  alkyl radical or H (for imidazoline precursors);  $R^7$  and  $R^8$  are each independently selected from the group consisting of R and  $R^2$  as defined hereinbefore for the single-long-chain cationic surfactant with only one being  $R^2$ .

Some alkyl pyridinium salts useful in the present invention have the general formula:

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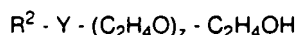


10 wherein  $\text{R}^2$  and  $\text{X}^-$  are as defined above. A typical material of this type is cetyl pyridinium chloride.

#### Nonionic Surfactant (Alkoxyated Materials)

Suitable nonionic surfactants for use herein include addition products of ethylene oxide and, optionally, propylene  
15 oxide, with fatty alcohols, fatty acids, fatty amines, etc.

Suitable compounds are substantially water-soluble surfactants of the general formula:



20 wherein  $\text{R}^2$  is selected from the group consisting of primary, secondary and branched chain alkyl and/or acyl hydrocarbyl groups; primary, secondary and branched chain alkenyl hydrocarbyl groups; and primary, secondary and branched chain alkyl- and alkenyl-substituted phenolic hydrocarbyl groups; said hydrocarbyl groups having a hydrocarbyl chain length of from 8 to 20, preferably from 10 to 18 carbon atoms.

Y is typically  $-\text{O}-$ ,  $-\text{C}(\text{O})\text{O}-$ ,  $-\text{C}(\text{O})\text{N}(\text{R})-$ , or  $-\text{C}(\text{O})\text{N}(\text{R})\text{R}-$ , in which  $\text{R}^2$  and R, when present, have the meanings given  
25 hereinbefore, and/or R can be hydrogen, and z is at least 8, preferably at least 10-11.

The nonionic surfactants herein are characterized by an HLB (hydrophilic-lipophilic balance) of from 7 to 20, preferably from 8 to 15.

Examples of particularly suitable nonionic surfactants include

- 30 - Straight-Chain, Primary Alcohol Alkoxylates such as tallow alcohol-EO(11), tallow alcohol-EO(18), and tallow alcohol-EO(25);
- Straight-Chain, Secondary Alcohol Alkoxylates such as 2-C<sub>16</sub>EO(11); 2-C<sub>20</sub>EO(11); and 2-C<sub>16</sub>EO(14);
- Alkyl Phenol Alkoxylates, such as p-tridecylphenol EO(11) and p-pentadecylphenol EO(18), as well as
- 35 - Olefinic Alkoxylates, and Branched Chain Alkoxylates such as branched chain primary and secondary alcohols which are available from the well-known "OXO" process.

#### Amine Oxides

Suitable amine oxides include those with one alkyl or hydroxyalkyl moiety of 8 to 28 carbon atoms, preferably from  
40 8 to 16 carbon atoms, and two alkyl moieties selected from the group consisting of alkyl groups and hydroxyalkyl groups with 1 to 3 carbon atoms.

Examples include dimethyloctylamine oxide, diethyldodecylamine oxide, bis-(2-hydroxyethyl)dodecylamine oxide, dimethyldodecyl-amine oxide, dipropyltetradecylamine oxide, methylethylhexadecylamine oxide, dimethyl-2-hydroxy-octadecylamine oxide, and coconut fatty alkyl dimethylamine oxide.

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#### Fatty Acids

Suitable fatty acids include those containing from 10 to 25, preferably from 12 to 25 total carbon atoms, with the fatty moiety containing from 10 to 22, preferably from 16 to 22, carbon atoms. The shorter moiety contains from 1 to 4,  
50 preferably from 1 to 2 carbon atoms. The level of unsaturation of the tallow chain can be measured by the Iodine Value (IV) of the corresponding fatty acid, which in the present case should preferably be in the range of from 5 to 100, more preferably in the range of from 0 to 25.

Specific examples of fatty acid compounds suitable for use in the aqueous fabric softening compositions herein include compounds selected from lauric acid, myristic acid, palmitic acid, stearic acid, arachidic acid, behenic acid,  
55 oleic acid, coconut fatty acid, tallow fatty acid, partially hydrogenated tallow fatty acid and mixtures thereof. A most preferred fatty acid compound is tallow fatty acid with an Iodine Value (IV) of 18.

Electrolyte Concentration Aids

The composition of the invention may also optionally comprise one or more electrolytes. It has been found that where electrolytes concentration aids were added to diluted softening compositions comprising thickeners but no sequestering component, the problem of phase and viscosity instability upon storage was increased. Surprisingly, compositions according to the invention allow the use of electrolytes concentration aids and still exhibit excellent phase and viscosity stability upon storage.

Electrolyte concentration aids, e.g. inorganic viscosity control agents, which can also act like or augment the effect of the surfactant concentration aids, include water-soluble, ionizable salts. These inorganic viscosity control agents can also optionally be incorporated into the compositions of the present invention. Incorporation of these components to the composition must be processed at a very slow rate. A wide variety of ionizable salts can be used. Examples of suitable salts are the halides of the Group IA and IIA metals of the Periodic Table of the Elements, e.g., potassium chloride, calcium chloride, magnesium chloride, sodium chloride, potassium bromide, and lithium chloride. The ionizable salts are particularly useful during the process of mixing the ingredients to make the compositions herein, and later to obtain the desired viscosity. The amount of ionizable salts used depends on the amount of active ingredients used in the compositions and can be adjusted according to the desires of the formulator. Typical levels of salts used to control the composition viscosity are from 20 to 20,000 parts per million (ppm), preferably from 20 to 11,000 ppm, by weight of the composition.

Alkylene polyammonium salts can be incorporated into the composition to give viscosity control in addition to or in place of the water-soluble, ionizable salts above. In addition, these agents can act as scavengers, forming ion pairs with anionic detergent carried over from the main wash, in the rinse, and on the fabrics, and may improve softness performance. These agents may stabilise the viscosity over a broader range of temperature, especially at low temperatures, compared to the inorganic electrolytes.

Specific examples of alkylene polyammonium salts include L-lysine monohydrochloride and 1,5-diammonium 2-methyl pentane dihydrochloride.

Still other optional ingredients are stabilisers, such as well-known antioxidants and reductive agents, Soil Release Polymers, thickeners, emulsifiers, bacteriocides, colorants, perfumes, preservatives, optical brighteners, anti ionisation agents, antifoam agents and enzymes.

Form of the composition

The fabric softening composition can take a variety of physical forms including liquid such as aqueous or non-aqueous compositions.

Such compositions may be used as a rinse added product, or as a spray or foam product. Preferably, the present composition is in a rinse added form.

The compositions of the invention can be added directly in the rinse both to provide adequate usage concentration, e.g., at least 50 ppm and more preferably from 100 to 10,000 ppm of the liquid rinse added fabric softener compositions of the present invention.

Accordingly, a method is provided for treating fabrics comprising contacting said fabrics in the rinse cycle with an aqueous medium containing at least 50 ppm, preferably from 100 to 10,000 ppm of the liquid fabric softening composition of the invention.

Process

The fabric softening composition can conveniently be made according to well-known processes to the skilled person. An exemplary disclosure is given in EP-A-0,668,902.

The invention is illustrated in the following non-limiting examples, in which all percentages are on a weight basis unless otherwise stated.

In the examples, the abbreviated component identifications have the following meanings:

DEQA	: Di-(tallowyl-oxy-ethyl) dimethyl ammonium chloride
Fatty acid	: Stearic acid of IV=18
Electrolyte	: Calcium chloride
PEG	: Polyethylene Glycol MW 4000
Velustrol® PKS	: Cationic polyethylene emulsion available from HOECHST Aktiengesellschaft

Example 1

The following fabric softening composition according to the present invention was prepared:



Component	A
DEQA	19.0
Hydrochlorid acid	0.02
Soil Release Polymer	0.02
PEG	0.6
Perfume	1.0
Electrolyte	600ppm
Dye	50ppm
Tinofix <sup>®</sup> ECO	1.0
Rewin <sup>®</sup> SRF-O	2.0
Water and minors to balance to 100%	

### Example 2

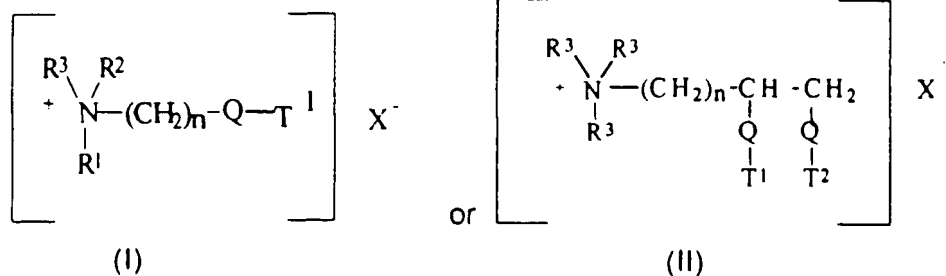
The following fabric softening compositions are in accordance with the invention:

Component	D	E	F	G
DEQA	2.6	2.9	18.0	19.0
Fatty acid	0.3	-	1.0	-
Hydrochlorid acid	0.02	0.02	0.02	0.02
Soil Release Polymer	-	-	0.02	0.02
PEG	-	-	0.6	0.6
Perfume	1	0.5	1	0.5
Electrolyte	-	-	600ppm	600ppm
Dye	10ppm	10ppm	50ppm	50ppm
Velustrol <sup>®</sup> PKS	-	-	-	2.6
Tinofix <sup>®</sup> ECO	0.3	0.3	1.0	0.3
Rewin <sup>®</sup> SRF-O	0.6	0.6	2.0	0.6
Water and minors to balance to 100%				

### Claims

1. A liquid fabric softening composition comprising one or more fabric softener materials and a mixture of at least two cationic dye fixing agents.
2. A liquid fabric softening composition according to Claim 1, wherein said mixture comprises at least one water-soluble and one water-insoluble dye fixing agents.
3. A liquid fabric softening composition according to either one of Claims 1 or 2, wherein said mixture of dye fixing agents is present in a total amount of 0.1% to 10% by weight, preferably from 0.5% to 8% by weight, more preferably 1% to 5% by weight of the composition.

4. A liquid fabric softening composition according to any one of Claims 1-3, wherein the ratio of water-soluble dye fixing agent to water-insoluble dye fixing agent is of 0.01:1 to 2:1, preferably 0.1:1 to 1:1, more preferably 0.3:1 to 0.8:1.
5. A liquid fabric softening composition according to any one of Claims 1-4, wherein said fabric softener is a cationic fabric softener.
6. A liquid fabric softening composition according to Claim 5, wherein said cationic fabric softener is selected from quaternary ammonium compounds and amine precursors having the formula (I) or (II), below :



wherein Q is selected from -O-C(O)-, -C(O)-O-, -O-C(O)-O-, -NR<sup>4</sup>-C(O)-, -C(O)-NR<sup>4</sup>-;

R<sup>1</sup> is (CH<sub>2</sub>)<sub>n</sub>-Q-T<sup>2</sup> or T<sup>3</sup>;

R<sup>2</sup> is (CH<sub>2</sub>)<sub>m</sub>-Q-T<sup>4</sup> or T<sup>5</sup> or R<sup>3</sup>;

R<sup>3</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> hydroxyalkyl or H;

R<sup>4</sup> is H or C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> hydroxyalkyl;

T<sup>1</sup>, T<sup>2</sup>, T<sup>3</sup>, T<sup>4</sup>, T<sup>5</sup> are independently C<sub>11</sub>-C<sub>22</sub> alkyl or alkenyl;

n and m are integers from 1 to 4; and

X<sup>-</sup> is a softener-compatible anion.

7. A method for treating fabrics comprising contacting said fabrics in the rinse cycle with an aqueous medium containing at least 50 ppm of a liquid fabric softening composition as defined in any one of Claims 1-6.



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 96 87 0069

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A, D	EP-A-0 462 806 (UNILEVER PLC ; UNILEVER NV (NL)) 27 December 1991 * page 2, line 1 - line 7 * * page 2, line 22 - line 34 * * page 3, line 12 - line 18 * * page 3, line 37 - line 41 * * page 4, line 38 - line 41 * * claims 1,9; example 3A *	1-7	C11D3/00 C11D3/30 C11D3/26
A	EP-A-0 188 242 (HENKEL KGAA) 23 July 1986 * claims 1,11,13; examples *	1-7	
A	EP-A-0 459 211 (KAO CORP) 4 December 1991 * page 2, line 3 - line 5; claims 1,4,11; example 4 *	1-7	
A	DATABASE WPI Section Ch, Week 9141 Derwent Publications Ltd., London, GB; Class A87, AN 91-299898 XP002016867 & JP-A-03 199 472 (KAO CORP) , 30 August 1991 * abstract *	1-7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C11D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 7 November 1996	Examiner Loiselet-Taisne, S
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document</p>			

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